

## ABSTRACT OF THE DISCLOSURE

A semiconductor structure is formed which has photosensors, vertical CCDs, a horizontal CCD and a light shielding film. A first insulating layer made of additive-containing silicon oxide is formed on the semiconductor

5 structure. It is reflowed and upward and downward convex inner lenses are formed on the reflowed first insulating layer and above the photosensors. A second insulating layer is formed which covers the inner lenses and is made of silicon oxide based insulator. It is planarized. Color filters are formed on the planarized surface of the second insulating layer. A transparent flat layer made

10 of transparent material is formed covering the color filters. Micro lenses are formed on the transparent flat layer. A low refractive index layer having a refractive index lower than the micro lenses is formed covering the micro lenses. A transparent plate is disposed on it. The semiconductor structure disposed with the transparent plate is packaged.